SCIENCE, AERONAUTICS AND TECHNOLOGY

FISCAL YEAR 2002 ESTIMATES

BUDGET SUMMARY

OFFICE OF AEROSPACE TECHNOLOGY **COMMERCIAL TECHNOLOGY PROGRAMS**

SUMMARY OF RESOURCES REQUIREMENTS

	FY 2000 OPLAN REVISED	FY 2001 OPLAN REVISED	FY 2002 PRES BUDGET	Page Number
		(Thousands of Dollars)		
Commercial Programs	35,049	43,105	29,800	SAT 4.2-2
Technology Transfer Agents	7,356	8,282	5,800	SAT 4.2-2
Small Business Innovation Research Programs	97,600	111,055	111,300	SAT 4.2-2
Total	140,005	162,442	146,900	
Distribution of Program Amount by Installation				
Johnson Space Center	14,242	15,094	14,196	
Kennedy Space Center	6,392	6,255	6,609	
Marshall Space Flight Center	17,121	16,017	16,504	
Stennis Space Center	5,000	4,714	4,977	
Ames Research Center	15,428	14,569	14,256	
Dryden Flight Research Center	4,200	3,921	4,200	
Langley Research Center	17,741	17,075	18,018	
Glenn Research Center	25,513	28,403	23,395	
Goddard Space Flight Center	29,668	32,398	39,931	
Jet Propulsion Laboratory	2,916	4,790	2,867	
Headquarters	1,784	19,205	1,947	
Total	140,005	162,442	146,900	

BASIS OF FY 2002 FUNDING REQUIREMENT

COMMERCIAL TECHNOLOGY PROGRAM

	FY 2000	FY 2001	FY 2002
		(Thousands of Dollars)	
Commercial Programs	35,049	43,105	29,800
Baseline Commercial Programs	(29,100)	(28,936)	(29,800)
Special Interest Projects	(5,949)	(14,169)	--
Technology Transfer	7,356	8,282	5,800
Baseline Tech Transfer Agents	(5,800)	(5,787)	(5,800)
Special Interest Projects	(1,556)	(2,495)	--
Small Business Innovative Research Program	97,600	111,055	111,300
Total Commercial Technology Programs	140,005	162,442	146,900

PROGRAM GOALS

NASA's Commercial Technology Program includes Commercial Programs, Technology Transfer Agents and the Small Business Innovative Research (SBIR) Program. NASA's Commercial Technology Program facilitates the transfer of NASA inventions, innovations, discoveries or improvements developed by NASA personnel or in partnership with industry/universities to the private sector for commercial application leading to greater U.S. economic growth and competitiveness.

The goal of Commercial Programs is to share the harvest of NASA's technology programs with the U. S. industrial/scientific community. The goal encompasses the commercialization of technology developed in all the Agency's Enterprises, in the recent past as well as current programs. The NASA Commercial Program mission includes a variety of mechanisms for achieving its goals: partnerships with industry/academia; federal/state/local alliances; emphasis on commercialization in new R&D procurements; electronic commerce; training and education of NASA employees/contractors; employee accountability; and application of performance goals/metrics.

The goal of Technology Transfer Agents is to facilitate the transfer of NASA and other federally sponsored research and technology (and associated capabilities) to the U. S. private sector for commercial application. The purpose of this program goal is to enhance U. S. industrial growth and economic competitiveness.

The goal of NASA's Small Business program is to promote the widest possible award of NASA research contracts to the small business community as well as to promote commercialization of the results of this research by the small business community.

Established by Congress, the SBIR program (which includes NASA's Small Business Technology Transfer (STTR) programs) helps NASA develops innovative technologies by providing competitive research contracts to U.S.-owned small businesses.

STRATEGY FOR ACHIEVING GOALS

Commercial Programs

Commercial Programs introduces a mix of practices/mechanisms, which enable the Agency to more closely align its way of doing business with that of the private sector. The common denominator in these practices is technology partnerships. Technology partnerships are business arrangements among government, industry, and/or academia wherein each party commits resources to the accomplishment of mutually agreed upon objectives and shares the risks and rewards of the endeavor. By working together, NASA and industry can push technologies of joint interest further and faster, while also reducing the costs to both parties.

The success of Commercial Programs is accomplished through:

- An extensive outreach program (technology dissemination and marketing);
- An electronic commerce/information network (via the Internet) that greatly facilitates the transfer of technology and allows very efficient implementation of our technology business contacts and services;
- Training and education of NASA employees to emphasize program relevance to national needs and to facilitate program implementation;
- The use of metrics that address management processes as well as bottom-line results;
- The establishment of productive technology development and application partnerships with industry.

Technology Transfer Agents

Technology Transfer Agents facilitate the transfer/use of NASA and other Federally sponsored research and technology (and associated capabilities) to the U. S. private sector for commercial application to enhance U. S. industrial growth and economic competitiveness. Technology Transfer Agents include funding for the National Technology Transfer Center (NTTC) at Wheeling Jesuit College in West Virginia and the TechLink Center at Montana State University.

In conformance with Congressional direction, NASA has funded the NTTC since 1990. The NTTC serves as a national resource for the transfer and commercialization of federal research and technology. A key, on-going strategy is to align and integrate NTTC operations with the NASA Commercial Technology Programs in support of the NASA Commercial Technology Mission. This strategy provides a foundation upon which the NTTC may fulfill its national role through technology transfer programs funded by other federal agencies and the provision of cost-recovery products and services. Accordingly, NASA has facilitated the involvement of other federal agencies to leverage and extend NTTC capabilities funded by NASA and has enabled the NTTC to implement cost-recovery activities in support of the overall federal technology transfer mission.

The NTTC performs four core roles:

1. Serve as a national gateway for federal technology transfer and commercialization, assisting U. S. industry to locate and access NASA and other federally-sponsored technology resources and sources of technical/business assistance;
2. Assess NASA and other federal technologies for commercial potential, and facilitate partnerships for technology commercialization;
3. Develop and deliver professional-level training in technology transfer and commercialization for NASA, federal agencies and other public and private sector audiences; and
4. Promote U. S. industry awareness and utilization of NASA and other federally sponsored research and technology resources available for commercial purpose.

Also in conformance with Congressional direction, NASA has established a cooperative agreement with Montana State University to establish and operate the TechLink Center, a rural states technology transfer and commercialization center. The mission of the TechLink Center is to assist firms and targeted industries in Montana, North Dakota, South Dakota, Wyoming and Idaho, to utilize and commercialize technologies from NASA, federal laboratories and universities. Small Business Innovative Research Program
The Small Business Innovation Research (SBIR) program helps NASA develop innovative technologies by providing competitive research contracts to U.S.-owned small businesses. The program is structured in three phases. Phase I is the opportunity to establish the feasibility, technical merit, and NASA mission need of a proposed innovation. Selected competitively, Phase I contracts have a term of six months and currently do not exceed $70,000. Phase II is the major R&D effort in SBIR. The most promising Phase I projects are selected to receive contracts worth up to $600,000 and have a term of up to two years. Approximately 50 percent of Phase I projects are approved for Phase II. Phase III is the completion of the development of a product or process to make it marketable. SBIR program funding cannot be used to support the Phase III program. Private sector investment and sales of products and services based on the SBIR technology is the usual source of Phase III funding.

SCHEDULES & OUTPUTS

Commercial Programs

Increase commercial partnerships Plan: December 1999 Actual: December 1999	Increase percentage of NASA R&D invested in commercial partnerships with a goal of achieving 15-20 percent.
Deploy Quarterly automated metric reporting system Plan: June 2000 Actual: February 2000	Complete deployment of quarterly automated metrics reporting module at all NASA centers.

Deploy Quarterly automated metric reporting system Plan: September 2000 Actual: September 2000	Complete deployment of electronic new technology reporting (eNTRe) at all NASA centers.
Update commercial assessment of NASA activities Plan: December 2000 Revised: September 2001	Update commercial assessment of NASA activities.
Increase partnership percent to goals 20 percent Plan: December 2000 Revised: September 2001	Increase partnership percent to goals 20 percent
Incorporate facilities as integral part of commercial assessment Plan: December 2000 Revised: September 2001	Incorporate NASA facilities as integral part of commercial assessment process.
Assess NASA technology for commercial application Plan: September 2002	Assess 100% of NASA technology for commercial application.
Maintain commercial partnership goals at 20 percent Plan: September 2002	Maintain commercial partnership goals at 20 percent.
Expand training program for NASA R&D program managers Plan: September 2002	Expand training program for NASA R&D program managers.

Technology Transfer Agents

Facilitate/broker 7 technology partnerships involving regional firms/organizations and NASA technology, research/technology objectives or capabilities. Plan: May 2000 Deleted	Facilitate/broker 7 technology partnerships involving regional firms/organizations and NASA technology, research/technology objectives or capabilities. [Note: task had been inappropriately included within Technology Transfer Agents; technology partnerships – by definition -- are included within the Commercial Technology baseline program]
Deliver 10 Commercial Technology training courses Plan: September 2000 Actual: September 2000	Deliver, through a partnership between the NTTC and NASA, 10 Commercial Technology training courses in FY 2000. [Note: the goal was not only accomplished as planned but 2 additional training courses were also delivered.]
Service a minimum of 16,000 inquiries and produce at least 750 qualified referrals Plan: September 2000 Actual: September 2000	Service a minimum of 16,000 inquiries and produce at least 750 qualified referrals for NASA technologies. [Note: highly qualified leads totaling 309 were derived through vigorous screening to determine partnership potential which is more beneficial to the Centers than a broad-band referral.]
Complete 25 in-depth commercialization potential assessments of technologies Plan: September 2000 Actual: September 2000	Complete 25 in-depth commercialization potential assessments of NASA technologies. [Note: the NTTC completed 36 screenings of NASA technologies and determined that 15 technologies were the most promising in the commercial environment.]
Facilitate the formation of licensing/partnership agreements for 10 NASA technologies Plan: September 2000 Actual: September 2000	Facilitate the formation of licensing/partnership agreements for 10 NASA technologies. [Note: although our goal was to establish 10 partnership agreements, which take approximately 2 years to negotiate and complete, 4 partnership agreements were completed.]
Deliver 14 Commercial Technology training courses in FY 2001 Plan: September 2001	Deliver, through a partnership between the NTTC and NASA, 14 Commercial Technology training courses in FY 2001.

Service industry technology inquiries and produce 200-300 highly qualified technologies leads Plan: September 2001	Service industry technology inquiries and produce 200-300* highly qualified leads for NASA technologies. [*Note: based on achievement in FY2000 and refocused screening efforts, 750 referrals have been revised to 200-300 highly qualified leads.)
Review 30 technologies and complete 9 in-depth potential assessments in FY 2001 Plan: September 2001	Review 30 NASA technologies and complete 9 in-depth commercialization potential assessments.
Formulate licensing/partnership agreements for 5-10 technologies in FY 2001 Plan: September 2001	Facilitate the formation of licensing/partnership agreements for 5-10* NASA technologies. [*Note: based on FY2000's accomplishment of 4 partnerships, using an estimate of 5-10 partnerships is more realistic.]
Deliver 14 Commercial Technology training courses in FY 2002 Plan: September 2002	Deliver, through a partnership between the NTTC and NASA, 14 Commercial Technology training courses in FY 2002.
Produce 200-300 highly qualified technologies leads in FY 2002 Plan: September 2002	Service industry technology inquiries and produce 200-300 highly qualified leads for NASA technologies in FY 2002.
Review 30 technologies and complete 9 in-depth potential assessments in FY 2002 Plan: September 2002	Review 30 NASA technologies and complete 9 in-depth commercialization potential assessments.
Formulate licensing/partnership agreements for 5-10 technologies in FY 2002 Plan: September 2002	Facilitate the formation of licensing/partnership agreements for 5-10 NASA technologies.

Small Business Innovative Research Program

Select and announce SBIR PY 1999 Phase I awards Plan: October 1999 Actual: October 1999	Select and announce SBIR PY 1999 Phase I awards.
Complete development and issue the PY 2000 SBIR Phase I solicitation Plan: April 2000 Actual: April 2000	Complete development and issue the PY 2000 SBIR Phase I solicitation.
Electronic submission of proposals via the internet at the close of PY2000 Phase I solicitation Plan: August 2000 Actual: July 2000	Electronic submission of proposals via the internet at the close of PY2000 Phase I solicitation.
Select and announce SBIR PY 1999 Phase II awards Plan: August 2000 Actual: September 2000	Select and announce SBIR PY 1999 Phase II awards.
Select and announce SBIR PY 2000 Phase I awards Plan: October 2000 Actual: December 2000	Select and announce SBIR PY 2000 Phase I awards.
Complete development and issue the PY 2001 SBIR Phase I solicitation Plan: April 2001	Complete development and issue the PY 2001 SBIR Phase I solicitation.
Electronic submission of proposals via the Internet at the close of PY2001 Phase I solicitation Plan: August 2001	Electronic submission of proposals via the Internet at the close of PY2001 Phase I solicitation.

Select and announce SBIR PY 2000 Phase II awards Plan: August 2001	Select and announce SBIR PY 2000 Phase II awards.
Select and announce SBIR PY2001 Phase I awards Plan: October 2001	Select and announce SBIR PY2001 Phase I awards
Complete development of and issue the PY 2002 SBIR Phase I solicitation Plan: June 2002	Complete development of and issue the PY 2002 SBIR Phase I solicitation.
Electronic submission of proposals via the internet at the close of PY2002 Phase I solicitation Plan: August 2002	Electronic submission of proposals via the internet at the close of PY2002 Phase I solicitation.
Select and announce SBIR PY 2001 Phase II awards Plan: August 2002	Select and announce SBIR PY 2001 Phase II awards.

ACCOMPLISHMENTS AND PLANS

Commercial Programs

In FY 2000, the emphasis of Commercial Programs was on showing steady improvement toward increasing the percentage of the NASA R&D budget in commercial partnerships. Also in FY 2000, deployment of electronic new technology reporting (eNTRe), which provides innovators and researchers a secure desktop tool for identifying and reporting new technologies and innovations, was completed. In conformance with FY 2000 Congressional direction pertaining to appropriation action, the following was completed: 1) The continuation of the Garrett Morgan initiative in Ohio to assist the establishment of Women and Minority owned businesses; and 2) an augmentation of the NTTC activity.

In FY 2000, commercial partnerships with industry achieved a level of about 19% and the technology and partnership database was refined, updating it to include new Agency contracting efforts and describe new technologies that were made public via the electronic network. NASA will continue to improve the utilization of the Internet as an electronic marketplace for NASA technology assets, facilitating technology transfer and commercialization opportunities between U.S. industry and NASA. We expanded training

opportunities focused on commercial technology strategy and its implementation within NASA's management training program. In FY2000, we initiated and have successfully established Strategic Technology Development Partnerships with the advanced materials and sensors/instruments industries. These partnerships meet the goal of establishing joint-sponsored R&D projects with industry to share risk and cost in the development of new technologies critical to NASA missions.

In FY2001, NASA plans to continue the goal of 15-20 percent of the NASA R&D budget in commercial partnerships with industry. NASA plans to have a fully operational Commercial Technology Training syllabus and curriculum accessible by NASA employees and deliver, through partnership between the NTTC and NASA, 14 commercial technology-training courses. The Commercial Program plans to expand services offered to each of the four NASA Enterprises and target a new non-aerospace industry sector – the medical devices industry. This furthers the goal of establishing joint-sponsored R&D projects with industry that will share risk and cost in the development of new technologies critical to NASA missions. In addition, NASA expects to introduce a new model for technology commercialization that leverages the high tech investment community for partnerships with NASA and the high tech business community.

The following Congressional programmatic activities will be performed in FY 2001:

1) Expanded Space Alliance outreach program in the states of NY, NM, TX, FL;
2) Continuation of the NASA-Illinois Technology Commercialization Center;
3) Extension of the Eye-Tracking technology development;
4) Continuation of the Earth Alert program;
5) Augmentation of the NTTC activities;
6) Initiation of the Rural Enterprise Inc program; and
7) Continuation of the Montana State TechLink center.

In FY2002, we plan to continue the percent of technology in partnership with industry in the 15-20 percent range, but will consider alternative metrics. NASA plans to expand the new training opportunities for NASA employees by delivering, through partnership between the NTTC and NASA, 14 commercial technology-training courses at NASA centers and the NTTC. In addition, we plan to initiate the fourth strategic partnership initiative with a non-aerospace industry sector.

Technology Transfer Agents

The National Technology Transfer Center (NTTC) is a national resource for NASA and federal technology transfer and commercialization. The NTTC performed as a national gateway for NASA technology, servicing inquiries and producing qualified leads leading to effective technology partnerships.

In FY 2000, 12 technology commercialization training sessions were delivered to NASA personnel to implement required skills and best practices throughout NASA, including 2 sessions on Intellectual Property, Technology Licensing and Commercializing Technologies. The NTTC performs as a national gateway for NASA technology, servicing thousands of inquires for NASA technology. In FY 2000, the NTTC produced 309 highly qualified referrals to NASA centers for technology transfer/commercialization partnerships. The 309 qualified leads versus the 750 planned referrals were due to more vigorous lead screening to yield higher

potential opportunities. The refocused screening process allows the NASA centers to focus more on completing a partnership [as opposed to contacting "casually interested" referrals. While the NTTC planned to complete 25 in-depth commercialization potential assessments of NASA technologies, a total of 36 in-depth screenings of NASA technologies were completed and commercialization assessments were provided for the 15 most promising technologies. The NTTC also facilitated partnership formation with private industry that led to 4 partnership agreements for NASA technologies. Partnership agreements take approximately 2 years to negotiate and complete. Although we estimated completing 10 partnership agreements, only 4 partnership agreements materialized. The NTTC proposed facilitating/brokering 7 technology partnerships involving regional firms/organizations as an FY2000 goal; however, NASA deleted this element from the NTTC's scope of work because this task is already included within the Commercial Technology baseline program.

Also in FY 2000, TechLink brokered 16 technology partnerships involving northwestern U.S. companies and NASA centers or NASA technology. These partnerships included 8 different NASA centers as well as companies in 5 Western states. In addition, TechLink facilitated 12 partnerships involving regional companies and the Department of Defense and other federal agencies, for a total of 28 partnerships (versus the goal of 15).

In FY 2001, the NTTC will deliver 14 technology commercialization training course sessions to NASA personnel; will develop two new training courses on "Software Release Authority" and "Creating a Commercialization Plan"; and will provide 2 internet based training courses for NASA personnel. The NTTC will continue to perform as a national gateway for NASA technology. The NTTC will assess approximately 2000 leads from industry in FY 2001 and produce 200-300 highly qualified referrals to NASA centers for technology transfer/commercialization partnerships. The lower range of 200-300 qualified leads is adopted for FY 2001 because the quality of leads (facilitated by the NTTC and referred to NASA) has increased greatly in the last fiscal year due to more stringent referral criteria. Qualified leads received by NASA represent companies that have more than just a passing interest in working with NASA. They represent only those companies that have a concrete interest in pursuing a partnership with NASA to commercialize its technologies. Based on industry practice, we expect 10-15% of all leads generated to be qualified. The NTTC will complete 30 technical reviews of NASA technologies, perform 5-10 commercialization strategies, and assist the formation of licensing/partnership agreements for about 5-10 NASA technologies. TechLink plans to facilitate at least 20 NASA-related technology partnerships, including Space Act and licensing agreements. In addition, it will facilitate another 18 technology partnerships between companies in its region and DoD and other federal research centers.

In FY 2002, the NTTC will continue to perform as a national gateway for NASA technology, providing about 200-300 highly qualified referrals to NASA centers for technology transfer/commercialization. The NTTC will facilitate 5-10 partnerships that will be either completed or in final discussion with the NASA Centers. In FY2002, the NTTC will deliver approximately 14 commercial technology training course sessions to NASA personnel; will develop a new training course on Small Business Innovation Research; will develop multimedia training course on NASA TechTracS; and will continue delivery of internet based training courses for NASA personnel. In FY 2002, TechLink goals for FY 2002 include at least 22 NASA-related technology partnerships and 20 additional technology partnerships with DoD and other federal agencies.

Small Business Innovative Research Program

In accordance with the Small Business Innovation Development Act of 1982, the actual SBIR funding level for the Agency is determined based on the results of a detailed analysis of the actual obligations for the most recent fiscal year that data is available. For FY 2000 and FY 2001, the funding levels are based on actual data. For FY 2002, the funding level shown for SBIR is a placeholder that is used for planning purposes only. In early FY 2002, the Office of the Comptroller will perform a detailed assessment on the Agency's most recent actual data. The results of this assessment will be used to validate that the actual SBIR funding level to the budgeted amount. If the budgeted amount is not valid a change will be reflected in the Agency's initial operating plan to Congress.

In FY 2000, the NASA SBIR program continues to contribute to the U. S. economy by fostering the establishment and growth of over 1,400 small, high technology businesses. The NASA SBIR commercialization survey was be extended to include commercial results for Phase II's awarded by NASA in 1995. More than 548 products and services at least partially based on NASA SBIR technology have generated revenues in non-government markets. In total NASA SBIR Phase II firms have produced Phase III agreements generating over $2 million per firm in revenues. In FY 2000, approximately 120 SBIR Program Year (PY) 1999 Phase I research proposals were selected for Phase II award September 6, 2000. This date was revised due to a program administrative delay, from the planned date of August 1999. The selected projects total approximately $72 million and were conducted by 97 small, high technology firms located in 27 states.

In FY 2001 the NASA SBIR PY2000 Solicitation resulted in selection of 280 research proposals for Phase I award, and was completed in December. Because of the delay in SBIR Reauthorization authority, that was signed on December 22nd. The award announcement date for SBIR PY2000 Phase I was delayed. Consequently, the associated Phase II award date has been revised. NASA achieved a 99 percent fully automated process, from proposal receipt to final report submission, and will achieve 100% pending adoption and use of federal & NASA electronic signature standards. The SBIR PY 2000 Phase II awards will be selected by August 2001. The information from the review/survey is being used to determine likelihood of commercial intent and, therefore, increase the effectiveness of the program's commercialization efforts. Finally, the process of correlating sub-topics with specific NASA mission applications and institutional needs continues to be a focus for strategic planning activities, with the intent to more closely tie the SBIR/STTR programs with each other as well as with both the mission needs of each NASA Enterprise and the institutional core of every NASA center.

In FY 2002, NASA's PY 2001 SBIR/STTR (Small Business Technology Transfer) solicitation will include both the SBIR and STTR subtopics. The descriptions will be developed, as before, by various NASA installations to include current and anticipated Agency program needs and institutional priorities. NASA typically receives over 2,000 proposals for the SBIR solicitation alone. For this combined solicitation, proposals will be evaluated by the NASA field centers for scientific and technical merit, key staff qualifications, soundness of the work plan, and plans for commercial application. NASA Headquarters (HQ) program offices will provide additional assessment regarding commercial, program balance, and critical Agency requirements. Selections will continue to be made by NASA HQ, based upon these recommendations, and other considerations. NASA will continue to expand the utilization of the Internet in the administration and management of these programs. NASA also provides information for public access via a bulletin board service and other Internet information servers.

Several other program initiatives continued to strengthen NASA's implementation of these small business programs. External evaluation of each proposal's ultimate commercial potential remains a fundamental part of the selection process. In addition, the continued comprehensive survey of past SBIR projects' Phase III commercialization and/or mission application remains vital to yielding valuable data about the program outcomes. In FY 2002, the commercialization survey will be extended to include commercial results for Phase II's awarded by NASA in 1996 and 1997. The PY 2001 SBIR Phase I awards will be selected by October 2001. The PY2001 Phase II awards will be selected by August 2002.